Site Investigation Phase 2 Sample and Analysis Plan
San Mateo Creek Legacy Uranium Sites
CERCLIS ID NMN00060684
Cibola and McKinley Counties, New Mexico

Superfund Oversight Section
Ground Water Quality Bureau
New Mexico Environment Department

October 12, 2010

Introduction

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 United States Code (U.S.C.) §§ 9601 to 9675 ("CERCLA"), the New Mexico Environment Department (NMED) Superfund Oversight Section will conduct a Site Investigation ("SI") of the San Mateo Creek legacy uranium sites ("Site"), Cibola and McKinley Counties, New Mexico (CERCLIS ID NMN00060684). The investigation will gather information and acquire sampling data to evaluate the site using the Hazard Ranking System (HRS) and the Superfund Chemical Data Matrix ("SCDM") to determine if threats to human health and the environment exist such that further action under CERCLA is warranted.

Site Description

The San Mateo Creek basin (Hydrologic Unit Code ["HUC"] 1302020703), by which the boundary of the Site is defined, comprises approximately 321 square miles within the Rio San Jose drainage basin in McKinley and Cibola counties, New Mexico. This basin is located within the Grants Mining District ("GMD"), which is an area of uranium mineralization occurrence approximately 100 miles long and 25 miles wide encompassing portions of McKinley, Cibola, Sandoval and Bernalillo counties. Main access into the Site is provided by New Mexico State Roads 605 and 509.

The San Mateo Creek basin contains 85 legacy uranium mines with recorded production and 4 legacy uranium millsites. One of these millsites, the Homestake Mining Company Superfund Site ("HMC," CERCLIS ID NMD007860935), currently is undergoing ground water remediation activities in 4 aquifers under the primary jurisdiction of the U.S. Nuclear Regulatory Agency ("NRC"). Background concentrations of constituents of concern for these 4 aquifers, which are promulgated as clean-up levels for HMC, mostly exceed federal and state drinking water and ground water standards. The origin of these elevated background contaminant concentrations is thought to be due, in part, to contamination from upgradient legacy uranium mine and mill sites within the basin. Far upgradient geochemical data from HMC suggest that overall alluvial ground water quality relative to drinking water standards, is degraded in comparison to the immediate upgradient vicinity of HMC, possibly due to the continuing migration of ground water that is impacted from the high concentration of legacy uranium sites in this area of the basin. Additionally, results from the first phase of this Site Investigation has indicated that 21 out of 28 private wells that were sampled within the upper San Mateo Creek basin had one or more exceedances of primary Maximum Contaminant Levels (MCLs).

Sampling activities

For this phase of the Site Investigation, NMED proposes to sample ground water from at least 4 existing wells within the upper San Mateo Creek basin drainage above HMC that were not previously sampled. In addition, NMED will attempt to recover ground water

samples from a disused deep private well, a possible mineshaft, and one or more exploration holes on property that abuts the Johnny M mine, and another sample from a port into the plugged shaft of the Johnny M mine itself. Finally NMED proposes to sample another residential well south of Laguna in response to the owner's request, who contacted NMED from concern generated by recent EPA correspondence regarding planned investigational activities in the GMD. The purpose of sampling of residential wells is to compare concentrations of contaminants commonly associated with legacy uranium activities in these wells to federal and state drinking and ground water standards. Additionally, all collected hydrochemical data will contribute to the understanding of potential ground water impacts from legacy uranium sites.

As previously, NMED also requests EPA assistance in performing analyses for radionuclide analyses (*e.g.*, radium$_{226+228}$, gross alpha and gross beta), and radionuclide isotopes, as these are essential both to characterize ground water contamination and to establish possible anthropogenic source attribution.

Water samples at each domestic well location will be collected from an access point closest to the well head if there is a dedicated pump already installed and operational. Samples collected from locations without a dedicated pump will require the utilization of a portable submersible pump or similar apparatus. All sampled locations will be purged for 15 minutes or until field parameters (*e.g.*, pH, conductivity, temperature) stabilize. Samples will be collected in the appropriate containers and preservatives, placed in insulated coolers with ice, and shipped to the laboratories specified by the CLP. All samples that are collected in this program will utilize chain-of-custody handling procedures.

Worker safety and the safe sampling of wells in the field will follow the requirements described in Site Safety Plan (Attachment 1). All field personnel will work in teams of at least 2 individuals, and shall have communication availability with project leaders. The collection of a representative ground water sample will follow the guidance described in the SOP, Section 7 – Ground Water Sampling, (Attachment 2). Level D is the appropriate Personal Protection Equipment ("PPE") level for the sampling of the proposed well locations.

The appropriate level of documentation for the field sampling event, sample chain-of-custody forms, laboratory results, and the site safety plan are the responsibility of the Project Management Team Leader, David L. Mayerson.

Table 1. Proposed ground water analytes for proposed Phase 2 Site Investigation ground water sampling for the San Mateo Creek legacy uranium sites, Cibola and McKinley counties, New Mexico.

A. Field parameters

Parameter
Electrical conductivity (EC)
pH
Temperature
Dissolved oxygen (DO)
Oxidation-reduction potential (ORP or Eh)

B. Laboratory analyses through CLP

Analyte	Maximum required detection limit (µg/L)
pH	-
Total Dissolved Solids	500,000
Carbonate (CO3)	-
Bicarbonate (HCO3)	-
Chloride (Cl)	250,000
Fluoride (F)	1,600
Sulfate (SO4)	250,000
Nitrate + Nitrite (NO3 + NO2)	10,000
Calcium (Ca)	5,000
Magnesium (Mg)	5,000
Sodium (Na)	5,000
Potassium (K)	5000
Aluminum (Al)	200
Antimony (Sb)	6*
Arsenic (As)	10
Barium (Ba)	1,000
Beryllium (Be)	4*
Cadmium (Cd)	5
Chromium (Cr)	50
Cobalt (Co)	50
Copper (Cu)	1,000
Iron (Fe)	300
Mercury (Hg)	2
Manganese (Mn)	50
Nickel (Ni)	200
Lead (Pb)	156
Molybdenum (Mo)	1,000
Silver (Ag)	50
Selenium (Se)	50
Thallium (Tl)	2*
Uranium (U)	30

Analyte	Maximum required detection limit (µg/L)
Vanadium (V)	50
Zinc (Zn)	5,000
Cation-anion balance (to assess relative data quality) .	

ICP-AES-CRQL lower detection limits are acceptable and preferred when available. Samples will be submitted for analysis of both total and dissolved metals listed above.
* Requesting lower Required Detection Limit than ICP-AES CRQL

C. Non-standard additional analyses requested through EPA CLP

Analyte	Required analytical detection limit
Gross Alpha	15 pCi/L
Radium-226 + 228 (^{226}Ra + ^{228}Ra)	5 pCi/L
Gross Beta	NS
Radium-226 (^{226}Ra)	
Radium-228 (^{228}Ra)	
Uranium-238 (^{238}U)	
Uranium-235 (^{235}U)	
Uranium-234 (^{234}U)	
Thorium-232 (^{232}Th)	
Thorium-230 (^{230}Th)	
Isotopes	
Delta Carbon-13 (∂^{13}C ‰)	
Delta Deuterium (∂D ‰)	
Delta Oxygen-18 (∂^{18}O ‰)	
Delta Sulfur-34 (∂^{34}S ‰)	
Delta Nitrogen-15 (∂^{15}N ‰)	

NS=not specified

Attachment 1: Site Safety Plan

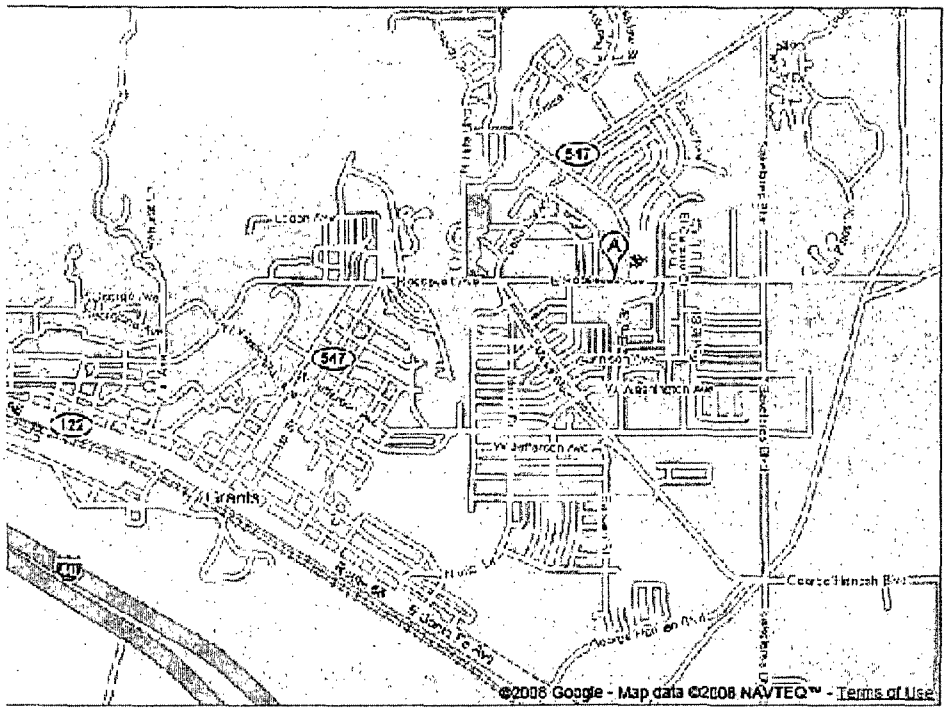
Personal Protection
Level of Protection (anticipated): D
Protective Clothing: Steel-toe boots and disposable nitrile gloves.
Surveillance Equipment: NA
Decontamination Procedures
Personnel: Wash any exposed skin with soap and water.
Equipment: Wash with liquinox, rinse with de-ionized water.
Contaminants of Concern:
Uranium, molybdenum, selenium, radium$_{226+228}$, nitrates (a NIOSH book is on site for reference.)
Other potential workplace hazards:

1. Slips, trips, and falls
2. Poisonous snakes
3. Heat dehydration/exhaustion/stroke
4. One large diameter open wellbore without barricade
5. Potential for vehicle miring in mud when raining on mill site
6. Low overhead pipes in supply wellhouses

Emergency Information

Hospital: Cibola General Hospital
1016 Roosevelt Avenue
Grants, NM 87020
(505) 287-4446

A. **Cibola General Hospital**
1016 E Roosevelt Ave, Grants, NM - (505) 287-4446



Facilities for Toxic Waste Related Emergency:
Milan Fire Department: (505) 287-3776
Hazardous Waste Bureau 24-hour Emergency number: (505) 827-1557

Telephone Numbers:
Ambulance: 911
Police: 911 or (505) 894-6617
NMED: (800) 219-6157
New Mexico Emergency Response: (505) 827-1557
Poison Control Center: (800) 432-6866
Fire Department: (505) 287-3776

Other:
Be careful to avoid slip, trip, and fall hazards. Stray dogs, insects, sunburn, and windburn are potential problems in this area. Avoid inciting dogs, wear gloves, and sunscreen. Drink plenty of water.

I have been briefed on the San Mateo Creek legacy uranium sites

Signature	Printed Name	Date
Signature	Printed Name	Date

Attachment A. Water Sample Target Analyte List, San Mateo Creek Legacy Uranium Sites, New Mexico.

Analyte (Total & Dissolved metals)	Maximum Required Detection Limit (µg/L)
pH	-
Total Dissolved Solids	500,000
Carbonate (CO3)	-
Bicarbonate (HCO3)	-
Chloride (Cl)	250,000
Fluoride (F)	1,600
Sulfate (SO4)	250,000
Nitrate + Nitrite (NO3 + NO2)	10,000
Calcium (Ca)	5,000
Magnesium (Mg)	5,000
Sodium (Na)	5,000
Potassium (K)	5000
Aluminum (Al)	200
Antimony (Sb)	6*
Arsenic (As)	10
Barium (Ba)	1,000
Beryllium (Be)	4*
Cadmium (Cd)	5
Chromium (Cr)	50
Cobalt (Co)	50
Copper (Cu)	1,000
Iron (Fe)	300
Mercury (Hg)	2
Manganese (Mn)	50
Nickel (Ni)	200
Lead (Pb)	156
Molybdenum (Mo)	1,000
Silver (Ag)	50
Selenium (Se)	50
Thallium (Tl)	2*
Uranium (U)	30
Vanadium (V)	50
Zinc (Zn)	5,000
Cation/anion balance	

ICP-AES-CRQL lower detection limits are acceptable and preferred when available.
* Requesting lower Required Detection Limit than ICP-AES CRQL

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau

Harold Runnels Building
1190 St. Francis Drive, P. O. Box 26110
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www.nmenv.state.nm.us

BILL RICHARDSON
Governor
DIANE DENISH
Lieutenant Governor

RON CURRY
Secretary
JON GOLDSTEIN
Deputy Secretary

August 18, 2008

Ms. LaDonna Turner
Site Assessment Manager
U. S. EPA Region 6 (6SF-TR)
Technical and Enforcement Branch
Superfund Division
1445 Ross Ave. Suite 1200
Dallas, Texas 75202

RE: Proposed sampling and analysis plan for the San Mateo Creek basin legacy uranium sites (CERCLIS ID NMN00060684) Site Investigation

Dear LaDonna:

The New Mexico Environment Department Superfund Oversight Section (SOS) herein submits a proposed sampling and analysis plan for proposed Contract Laboratory Program (CLP) sampling activities associated with a site investigation of the above-referenced site. The purpose of this site investigational sampling task is to further investigate the potential release contaminants related to basinwide legacy uranium mining and milling activities to ground water.

As has been discussed previously with you, SOS is proposing the inclusion of selected radioisotope analyses for this sampling event in addition to analyses for general chemistry and metals. These radioisotopic analyses may provide data that allows for distinction among other potential sources of the contaminants that are associated with this site, including natural mineralization. Since these analyses are not ordinarily included within the scope of the EPA's CLP, SOS requests your assistance in the identification of other Federal laboratories that will provide these analyses under the CLP.

If you should have any questions about this workplan, please contact David L. Mayerson at (505) 476-3777 or at david.mayerson@state.nm.us, or Earle Dixon at (505) 827-2890 or earle.dixon@state.nm.us.

Sincerely,

Dana Bahar
Manager
Superfund Oversight Section

Enclosure: Site Investigation Sample Plan, Anaconda Company Bluewater Uranium Mill Site, CERCLIS ID NMD007106891, Cibola County, New Mexico

Copies:
David L. Mayerson, SOS

NMED/GWQB/SOS August 2008 read file

NEW MEXICO
ENVIRONMENT DEPARTMENT

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BILL RICHARDSON
Governor
DIANE DENISH
Lieutenant Governor

RON CURRY
Secretary
JON GOLDSTEIN
Deputy Secretary

June 29, 2009

Ms. LaDonna Turner
Site Assessment Manager
U. S. EPA Region 6 (6SF-TR)
Technical and Enforcement Branch
Superfund Division
1445 Ross Ave. Suite 1200
Dallas, Texas 75202

RE: Proposed sampling and analysis plan for the San Mateo Creek basin legacy uranium sites (CERCLIS ID NMN00060684) Phase 2 Site Investigation

Dear LaDonna:

The New Mexico Environment Department Superfund Oversight Section (SOS) herein submits a proposed sampling and analysis plan for sampling activities associated with a Phase 2 Site Investigation of the above-referenced site. The purpose of this site investigational sampling task is to further investigate the potential release to ground water of contaminants related to basinwide legacy uranium mining and milling activities.

SOS herein proposes to collect ground water samples from private wells within the area designated by EPA as "Area 4" of the San Mateo Creek basin, which encompasses the Poison Canyon area. The purpose of this sampling is to assess and identify possible impacts to ground water from legacy uranium mining activity within this area, and to advise wellowners of these impacts for the protection of the public's health. The sampling will also include any mine wells that are found during ongoing assessment activities, including one that was recently discovered within the "Barbara J" mine complex. The sampling is proposed to occur between July 20 and 23, 2009.

As in the previous phase of this SI, SOS will arrange for analysis of radionuclide concentrations through the State Laboratory Division, and for isotopic analyses through UNM. All other samples will be submitted for analysis through the CLP or Houston Laboratories.

If you should have any questions about this workplan, please contact David L. Mayerson at (505) 476-3777 or at david.mayerson@state.nm.us, or Earle Dixon at (505) 827-2890 or earle.dixon@state.nm.us.

Sincerely,

Dana Bahar
Manager
Superfund Oversight Section

Enclosures: Phase 2 Site Investigation Sample and Analysis Plan, San Mateo Creek Legacy Uranium Sites, CERCLIS ID NMN00060684, Cibola and McKinley counties, New Mexico
San Mateo Creek Legacy Uranium Sites Phase 2 SI sampling projection
San Mateo Creek Legacy Uranium Sites Phase 2 SI RLSA

Copies: David L. Mayerson, SOS

NMED/GWQB/SOS read file

Region 6 Sample Control Center, FAX 281-983-2248

REQUEST FOR LABORATORY SAMPLE ANALYSES

Site Name: San Mateo Creek Basin Legacy Uranium Sites phase 2 SI	City/State: Milan, NM	CERCLIS #: NMN00060684
GPRA Account #:	Site Spill ID #/ Operable Unit:	Type of Investigation/Purpose: Site Inspection/GW Sampling
EPA SAM, RPM, OSC: LaDonna Turner Mail Code: 6SF-TR	Analytical Turnaround Time: Region 6 Lab: CLP Organics: 7___ 14___ 21 CLP Inorganics: 7___ 14_X_ 21	Type of Contract: Contractor: NMED Shipping Contact: David Mayerson
Telephone #: 214-665-6666	Are preliminary results required? * See Note Below * 48 hrs VOA ( ) Yes () No 72 hrs Extractables ( ) Yes () No 72 hrs Inorganics ( ) Yes () No	Telephone #: 505-476-3777
Fax #:214-665-6660		On Site Ph #: TBD Fax #: 505-827-2965
Potential Enforcement Action? ( ) Yes (X) No	**Preliminary Results Fax #:** 505-827-2965	Date Sample Control Center Received Request For Sample Analysis:
Proposed Sampling Period: July 20-23, 2009		

Please assure that this request for analytical services has been signed and dated by the appropriate Site

Preliminary Results: Requests for preliminary results must be limited to those circumstances where fast data turnaround times are needed to facilitate removal/remedial clean-up and emergency response actions. CLP preliminary results data are not considered to be data of known quality. As the name "preliminary" implies, the analytical results are tentative and may change.

Assessment Manager, Remedial Project Manager, or On Scene Coordinator. Please assure that the Sample Control Center has a copy of all relevant Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs).

Is the QAPP, QASP, SAP,O&M Plan, GWMP, DAW, or other relevant plan being submitted with this Request For Sample Analyses? The SAP is submitted with this RLSA.

If no, please explain(expected date of submission etc.):

Signature of **EPA Site Assessment Manager (SAM), Remedial Project Manager (RPM), or On Scene Coordinator (OSC)** to signify approval of this analytical service request.

Signature: _____ Date:

To most efficiently obtain laboratory capability for your request, please address the following considerations. Incomplete or erroneous information may result in a delay in the processing of your request.

1. General description of analytical services requested: (QA/R5 - Element B1)

Matrix	Analysis	Number of Samples (without QC)	Field QC Samples	
			How many?	Type?
Water	ILM05.4	10	1 1 1	Duplicate Field Blank Equipment Blank
Water	Chloride, Sulfate, Fluoride	10	1 1 1	Duplicate Field Blank Equipment Blank

Additional description (areas where samples are being collected etc.):

2. Analytical protocol required (analytical method & method number, extraction or digestion method & method number, CLP SOW reference, for each matrix if required, etc.): (QA/R5 - Element B4)

Matrix	Analysis	Methods
Water	TAL Total and Dissolved Metals plus Uranium and Molybdenum (200.8 and 200.7)	ILM05.4
Water	Chloride (300.0), Sulfate (300.0), Fluoride (340.2)	No CLP SOW
		No CLP SOW

Additional Information:
Requesting additional analytes be analyzed: pH, carbonate (CO3), sulfate (SO4), chloride (Cl), fluoride (F).

Complete the following information if **Method 5035 for VOA soils** has been requested:

	# of low conc. soils	# of medium conc. soils		Type of Vials	# of low conc. soils	# of medium conc. soils
ENCORES			Pre-weighed vials			

3. Special technical instructions (specify any requirements outside of existing protocol such as target analytes, reporting limits, etc.): (QA/R5 - Elements A6 and B4)

4.

NMED requests EPA to identify resources for the following analyses:
Isotopic analyses: U238, U235, U234, U232, Th230, Th232, Ra226, Ra228, delta carbon-13, delta deuterium, delta oxygen-18, delta sulfur-34, delta nitrogen-15.

Lower detection limits for Sb (6 ppb), Be (4 ppb), and Th (2 ppb)

CLP Flexibility Clause - The latest CLP Organic Statement of Work (SOW), OLM04.2, includes a flexibility clause. This clause allows the regions to request minor changes to current SOW analytical methods in order to meet specific field site requirements. The changes are limited in scope and must be approved by the EPA CLP Program Manager and Contracting Officer before implementation. **Information must be submitted four weeks prior to the sampling event, and the laboratories must agree to perform the analysis at no additional cost. http://www.epa.gov/superfund/programs/clp/methflex.htm**

4. Analytical results required (specify laboratory documentation and reporting requirements, reporting units, format requirements, etc.): (QA/R5 - Elements A6 and B4)

5. Other (any additional specifications, attach supplementary information if needed): (QA/R5 - Element B4)

See Attachment A

6. Data requirements (reporting limits; per analyte per matrix; reporting units; applicable reference levels, etc.): (QA/R5 - Elements A7, B1, and B4) (Attach extra pages if necessary) For CLP capabilities - **http://www.epa.gov/superfund/programs/clp/facts.htm.** For Region 6 Laboratory capabilities - **http://www.epa.gov/earth1r6/6lab/r6lab.htm**

Note: Samples submitted to the CLP for analysis must be low or medium concentration, single phase, homogenous (not oily), soil, sediment, or water.

NOTE: Samples with matrix related problems (oily material, high concentration of compounds, etc.) and/or high moisture content will raise the detection limits.

Parameter	Detection Limit	
	water (units)	soil/sediment (units)
Total and Dissolved Metals	Attachment A	N/A

a. Compounds/chemicals of concern (Action levels etc.)

Parameter Attachment A	Detection Limit water (units)		soil/sediment (units)

7. Requirements (PE samples & frequency, spikes, duplicates, blanks, & frequency)

QC Type	Frequency	QC Limits
Duplicate	1 per 20	CLP Limits
Field Blank	1 per 20	CLP Limits
Equipment Blank	1 per 10 each pump	CLP Limits
MS/MSD	1 per 20	CLP Limits

8. Data Assessment Options (For CLP generated data only)

Data assessment options apply only to data acquired through the CLP using the Organic Multi-Media/Multi-Concentration SOW - OLM04.2. See Attachment 5 (Region 6 Organic Data Assessment Options).
Data turnaround times refer to calendar days.

Mark the level of data assessment needed:

XX Level 3 - Full data validation (14 day turnaround)*

❑ Level 2 - Results qualified by computer, partial validation by ESAT (7 day turnaround)*

Level 1 - Results qualified by computer, minimal validation by ESAT (3 day turnaround)*

*** Plus 1 - 5 days for processing and mailing.**

Submit one form per site, per week of sampling. CLP ( ) / Houston Lab (X)

Site Name: San Mateo Creek Basin Legacy Uranium Sites Phase 2 SI
CERCLIS ID NMN00060684

Projected Wk. of Sampling: July 20-23, 2009

Contract Laboratory Program (CLP) and/or Houston Lab Request for Regional Projections for October 2008 for Region 6 (please use a separate form for CLP and the Houston Lab)

SOM01.2	Trace Water By SIM	Trace Water	Low Water	Low Soil	Low Soil By SIM	Med Soil	Turnaround Time				PDF file of hardcopy data	
							7	14	21	**PR	(YES)	(NO)
VOA											PDF file must be requested at the time of scheduling. **CLP Only**. There is an extra cost ranging from 1% to 10% of price per sample. PDF file is submitted as a CD with the hardcopy data package.	
BNA												
Pest												
Arochlors												

** = Preliminary Results = 48 hrs for VOA's/ 72 hrs for BNA/Pest/Arochlors

Note: SIM = Selective Ion Monitoring, available for 3 compounds in the VOA fraction and 18 in the BNA fraction. Modified Analysis or Flex-Clause is available. Three weeks lead time required. Contact Christy Warren (281/983-2137) or Myra Perez (281/983-2130) for additional information.

Method 5035 – For VOA analysis of soils

SOM1.2	# of low Conc. soils	# of med Conc. soils
ENCORES		
Pre-Weighed Vials (Closed System Vials		

ILM05.4 SOW	**PR	Turnaround Time		
		7	14	21
TAL Metals + CN + Hg				
TAL Metals + CN				
TAL Metals + Hg			13	
TAL METALS only				
Dissolved Metals			13	
ICP-MS (waters only)				

Select a specific metal from the target analyte list or several metals

Analyte not listed on the target analyte list
Uranium (238, 235, 234), Molybdenum, gross alpha, gross beta, Radium (226, 228), Thorium (232, 230), delta carbon-13, delta deuterium, delta oxygen-18, delta sulfur-34, delta nitrogen-15.

**PR = Preliminary Results = 72 hrs for metals

The use of F2Lite is mandatory for all CLP sampling activities

The new organic SOW, SOM01.2 is currently in use.
For brief summary please link to this site:
http://www.epa.gov/superfund/programs/clp/download/som/som11-factsheet.pdf

The **ILM05.4** SOW allows the client to request analysis of water samples by ICP-MS on a routine basis. You can also select one metal or several metals. The client will also have the option of requesting a metal not listed on the metals target analyte list. (Ex. Molybdenum)
http://www.epa.gov/superfund/programs/clp/download/ilm/ilm54fs.pdf

A modified analysis or flex-clause is required when you request The following options:

A) a target compound or analyte not listed
B) lower detection levels than those specified by the SOW
C) different matrices (fish, wipes, . . . etc)

The client must provide three weeks advance notice for the modified analysis or flex-clause option.

Additional analytes requested to be analyzed include: pH, Total dissolved Solids, Carbonate, Bicarbonate, Sulfate, Fluoride, Chloride, Nitrate + Nitrite; U-238, U235, U234, U232, Th230, delta carbon-13, delta deuterium, delta oxygen-18, delta sulfur-34, delta nitrogen-15. **Total samples collected for these parameters would also be 13.**

Signature of SAM, RPM, OSC | Mail Code | Date | **Indicate type of contract & contractor**

Please FAX to: Myra Perez, External Lab. Oversight Team (281/983-2124) by October, 2008

Phase 2 Site Investigation Sample and Analysis Plan
San Mateo Creek Legacy Uranium Sites
CERCLIS ID NMN00060684
Cibola and McKinley Counties, New Mexico

Superfund Oversight Section
Ground Water Quality Bureau
New Mexico Environment Department

June 25, 2009

Introduction

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Sampling activities

For the Phase 2 of this Site Investigation, NMED proposes to sample residential and other private wells within the Poison Canyon area along Haystack Road from New Mexico State Highway 605 to the border of the Navajo Nation. The purpose of this sampling is to determine if contaminant concentration and other hydrochemical changes can be discerned, which would indicate continuing downgradient contaminant migration from legacy uranium sites within the Ambrosia Lake mining subdistrict of the San Mateo

Creek basin. Samples will be submitted through CLP for analyses of total and dissolved metal concentrations, nitrite + nitrate, and general chemistry. Additionally, NMED proposes to submit samples to state-contracted laboratories for radionuclide (*e.g.*, $radium_{226+228}$, gross alpha and gross beta), and radioisotopes analyses, since CLP does not have SOWs to address these analyses, and these analyses are essential both to characterize ground water contamination and to establish possible anthropogenic source attribution.

Water samples at each domestic well location will be collected from an access point closest to the well head if there is a dedicated pump already installed and operational. Well locations without a dedicated pump will require the utilization of a portable submersible pump or similar apparatus. Domestic wells will be purged for 15 minutes or until field parameters (*e.g.*, pH, conductivity, temperature) stabilize. Samples will be collected in the appropriate containers and preservatives, placed in insulated coolers with ice, and shipped to the laboratories specified by the CLP. All samples that are collected in this program will utilize chain-of-custody handling procedures.

Worker safety and the safe sampling of wells in the field will follow the requirements described in Site Safety Plan (Attachment 1). All field personnel will work in teams of at least 2 individuals, and shall have communication availability with project leaders. The collection of a representative ground water sample will follow the guidance described in the SOP, Section 7 – Ground Water Sampling, (Attachment 2). Level D is the appropriate Personal Protection Equipment ("PPE") level for the sampling of the proposed well locations.

The appropriate level of documentation for the field sampling event, sample chain-of-custody forms, laboratory results, the site safety plan, and report preparation are the responsibility of the Project Management Team Leader, David L. Mayerson.

Table 1. Proposed ground water analytes for proposed Site Investigation ground water sampling for the San Mateo Creek legacy uranium sites, Cibola and McKinley counties, New Mexico.

A. Field parameters

Parameter
Electrical conductivity (EC)
pH
Temperature
Dissolved oxygen (DO)
Oxidation-reduction potential (ORP or Eh)

B. Laboratory analyses through CLP

Analyte (Total & Dissolved)	MAXIMUM Required Detection Limit (µg/L)
pH	-
Carbonate (CO3)	-
Chloride (Cl)	250,000
Fluoride (F)	1,600
Sulfate (SO4)	250,000
Calcium (Ca)	5000
Magnesium (Mg)	5000
Sodium (Na)	5000
Potassium (K)	5000
Aluminum (Al)	50
Antimony (Sb)	6
Arsenic (As)	10
Barium (Ba)	200
Beryllium (Be)	4
Cadmium (Cd)	5
Chromium (Cr)	50
Cobalt (Co)	50
Copper (Cu)	1000
Iron (Fe)	1000
Mercury (Hg)	2
Manganese (Mn)	50
Nickel (Ni)	200
Lead (Pb)	15
Molybdenum (Mo)	1000
Silver (Ag)	50
Selenium (Se)	35
Thallium (Tl)	2
Uranium (U)	30
Vanadium (V)	50

Analyte (Total & Dissolved)	MAXIMUM Required Detection Limit (µg/L)
Zinc (Zn)	5000
Total dissolved solids (TDS)	500,000 µg/l
Nitrate + nitrite ($NO_3 + NO_2$)	10,000 µg/l
Bicarbonate (HCO_3)	NS
Carbonate	NS

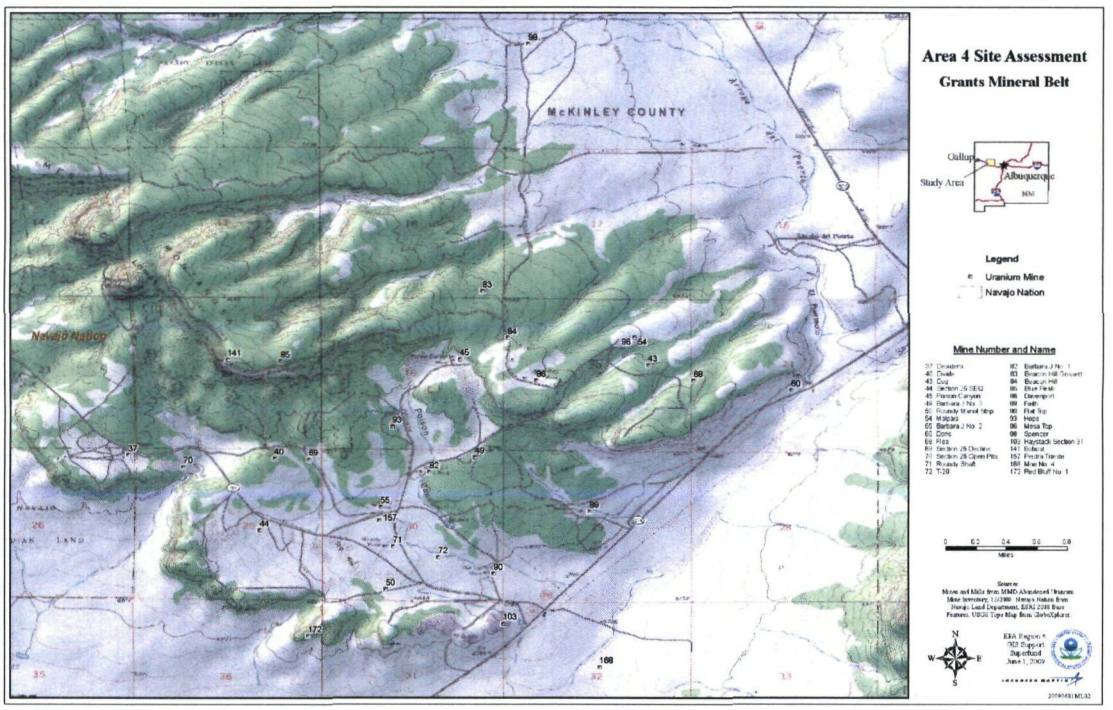
C. CLP non-standard additional analyses

Analyte	Required analytical detection limit
Gross Alpha	15 pCi/L
Radium-226 + 228 ($^{226}Ra + ^{228}Ra$)	5 pCi/L
Gross Beta	NS
Radium-226 (^{226}Ra)	NS
Radium-228 (^{228}Ra)	NS
Uranium-238 (^{238}U)	NS
Uranium-235 (^{235}U)	NS
Uranium-234 (^{234}U)	NS
Thorium-232 (^{232}Th)	NS
Thorium-230 (^{230}Th)	NS

Isotopes
Delta Carbon-13 ($\partial^{13}C$ ‰)
Delta Deuterium (∂D ‰)
Delta Oxygen-18 ($\partial^{18}O$ ‰)
Delta Sulfur-34 ($\partial^{34}S$ ‰)
Delta Nitrogen-15 ($\partial^{15}N$ ‰)

NS=not specified

Figure 1: Area of proposed well sampling



Attachment 1: Site Safety Plan

Personal Protection
Level of Protection (anticipated): D
Protective Clothing: Steel-toe boots and disposable nitrile gloves.
Surveillance Equipment: NA
Decontamination Procedures
Personnel: Wash any exposed skin with soap and water.
Equipment: Wash with liquinox, rinse with de-ionized water.
Contaminants of Concern:
Uranium, molybdenum, selenium, radium$_{226+228}$, nitrates (a NIOSH book is on site for reference.)
Other potential workplace hazards:

1. Slips, trips, and falls
2. Poisonous snakes
3. Heat dehydration/exhaustion/stroke
4. One large diameter open wellbore without barricade
5. Potential for vehicle miring in mud when raining on mill site
6. Low overhead pipes in supply wellhouses

Emergency Information

Hospital: Cibola General Hospital
1016 Roosevelt Avenue
Grants, NM 87020
(505) 287-4446

A. **Cibola General Hospital**
1016 E Roosevelt Ave, Grants, NM - (505) 287-4446

Facilities for Toxic Waste Related Emergency:
Milan Fire Department: (505) 287-3776
Hazardous Waste Bureau 24-hour Emergency number: (505) 827-1557

Telephone Numbers:
Ambulance: 911
Police: 911 or (505) 894-6617
NMED: (800) 219-6157
New Mexico Emergency Response: (505) 827-1557
Poison Control Center: (800) 432-6866
Fire Department: (505) 287-3776

Other:
Be careful to avoid slip, trip, and fall hazards. Stray dogs, insects, sunburn, and windburn are potential problems in this area. Avoid inciting dogs, wear gloves, and sunscreen. Drink plenty of water.

I have been briefed on the San Mateo Creek legacy uranium sites

Signature	Printed Name	Date
Signature	Printed Name	Date

EPA

United States of America
Environmental Protection Agency

A FAX FROM: Superfund Division - Region 6

TO:	FAX NO.:
Christy or Myra	281-983-2248

SUBJECT: San Mateo

FROM:	PHONE NO.:
LaDonna	
OFFICE:	FAX NO. FOR: (214) 665-6660

COMMENTS:

DATE and TIME:	NO. of PAGES:
3/25/09	5

EPA Form 1315-18 (Rev. 5/97) (WebForms v1.0)

Region 6 Sample Control Center, FAX 281-983-2248

REQUEST FOR LABORATORY SAMPLE ANALYSES

Site Name: San Mateo Creek Basin Legacy Uranium Sites SI	City/State: Milan, NM	CERCLIS #: NMN00060684
GPRA Account #:	Site Spill ID #/ Operable Unit: A6K6	Type of Investigation/Purpose: Site Inspection/GW Sampling
EPA SAM, RPM, OSC: LaDonna Turner Mail Code: 6SF-TR	Analytical Turnaround Time: Region 6 Lab: 35 CLP Organics: 7___ 14___ 21 CLP Inorganics: 7___ 14_X_ 21	Type of Contract: Contractor: NMED *Shipping Contact:* David Mayerson and/or Earle Dixon
Telephone #: 214-665-6666	Are preliminary results required? * See Note Below *	Telephone #: 505-476-3777
Fax #:214-665-6660	48 hrs VOA ( ) Yes () No 72 hrs Extractables ( ) Yes () No 72 hrs Inorganics (X) Yes () No	On Site Ph #: 505-660-0173 Fax #: 505-827-2965
Potential Enforcement Action? ( ) Yes (X) No	**Preliminary Results Fax #:** 505-827-2965	Date Sample Control Center Received Request For Sample Analysis:
Proposed Sampling Period: March 30-31 & April 1-3, 2009		

Please assure that this request for analytical services has been signed and dated by the appropriate Site

Preliminary Results: Requests for preliminary results must be limited to those circumstances where fast data turnaround times are needed to facilitate removal/remedial clean-up and emergency response actions. CLP preliminary results data are not considered to be data of known quality. As the name "preliminary" implies, the analytical results are tentative and may change.

Assessment Manager, Remedial Project Manager, or On Scene Coordinator. Please assure that the Sample Control Center has a copy of all relevant Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs).

Is the QAPP, QASP, SAP,O&M Plan, GWMP, DAW, or other relevant plan being submitted with this Request For Sample Analyses? The SAP is submitted with this RLSA.

If no, please explain(expected date of submission etc.):

Signature of **EPA Site Assessment Manager (SAM), Remedial Project Manager (RPM), or On Scene Coordinator (OSC)** to signify approval of this analytical service request.

Signature: LaDonna Turner Date: 3/25/09

To most efficiently obtain laboratory capability for your request, please address the following considerations. Incomplete or erroneous information may result in a delay in the processing of your request.

1. General description of analytical services requested: (QA/R5 - Element B1)

Matrix	Analysis	Number of Samples (without QC)	Field QC Samples	
			How many?	Type?
Water	ILM05.4	35	2 2 1	Duplicate Field Blank Equipment Blank
Water	Chloride, Sulfate, Fluoride	35	2 2 1	Duplicate Field Blank Equipment Blank

Additional description (areas where samples are being collected etc.):

2. Analytical protocol required (analytical method & method number, extraction or digestion method & method number, CLP SOW reference, for each matrix if required, etc.): (QA/R5 - Element B4)

Matrix	Analysis	Methods
Water	TAL Total and Dissolved Metals plus Uranium and Molybdenum (200.8 and 200.7)	ILM05.4
Water	Chloride (300.0), Sulfate (300.0), Fluoride (340.2)	No CLP SOW
		No CLP SOW

Additional Information:
Requesting additional analytes be analyzed: pH, carbonate (CO3), sulfate (SO4), chloride (Cl), fluoride (F). The parameters would also number 40 samples with field QC samples.

Complete the following information if **Method 5035 for VOA soils** has been requested:

	# of low	# of medium		Type of Vials	# of low	# of medium

	conc. soils	conc. soils			conc. soils	conc. soils
ENCORES			Pre-weighed vials			

3. Special technical instructions (specify any requirements outside of existing protocol such as target analytes, reporting limits, etc.): (QA/R5 - Elements A6 and B4)

Isotopic analyses: U238, U235, U234, U232, Ra226, Ra228, delta carbon-13, delta deuterium, delta oxygen-18, delta sulfur-34.

Lower detection limits for Sb (6 ppb), Be (4 ppb), and Th (2 ppb)

CLP Flexibility Clause - The latest CLP Organic Statement of Work (SOW), OLM04.2, includes a flexibility clause. This clause allows the regions to request minor changes to current SOW analytical methods in order to meet specific field site requirements. The changes are limited in scope and must be approved by the EPA CLP Program Manager and Contracting Officer before implementation. **Information must be submitted four weeks prior to the sampling event, and the laboratories must agree to perform the analysis at no additional cost. http://www.epa.gov/superfund/programs/clp/methflex.htm**

4. Analytical results required (specify laboratory documentation and reporting requirements, reporting units, format requirements, etc.): (QA/R5 - Elements A6 and B4)

5. Other (any additional specifications, attach supplementary information if needed): (QA/R5 - Element B4)

See Attachment A

6. Data requirements (reporting limits; per analyte per matrix; reporting units; applicable reference levels, etc.): (QA/R5 - Elements A7, B1, and B4) (Attach extra pages if necessary) For CLP capabilities - **http://www.epa.gov/superfund/programs/clp/facts.htm**. For Region 6 Laboratory capabilities - **http://www.epa.gov/earth1r6/6lab/r6lab.htm**

Note: Samples submitted to the CLP for analysis must be low or medium concentration, single phase, homogenous (not oily), soil, sediment, or water.

NOTE: Samples with matrix related problems (oily material, high concentration of compounds, etc.) and/or high moisture content will raise the detection limits.

Parameter	Detection Limit	
	water (units)	soil/sediment (units)
Total and Dissolved Metals	Attachment A	N/A

a. Compounds/chemicals of concern (Action levels etc.)

Parameter Attachment A	Detection Limit water (units)		soil/sediment (units)

7. Requirements (PE samples & frequency, spikes, duplicates, blanks, & frequency)

QC Type	Frequency	QC Limits
Duplicate	1 per 20	CLP Limits
Field Blank	1 per 20	CLP Limits
Equipment Blank	1 per 10 each pump	CLP Limits
MS/MSD	1 per 20	CLP Limits

8. Data Assessment Options (For CLP generated data only)

Data assessment options apply only to data acquired through the CLP using the Organic Multi-Media/Multi-Concentration SOW - OLM04.2. See Attachment 5 (Region 6 Organic Data Assessment Options).
Data turnaround times refer to calendar days.

Mark the level of data assessment needed:

XX Level 3 - Full data validation (14 day turnaround)*

❑ Level 2 - Results qualified by computer, partial validation by ESAT (7 day turnaround)*

Level 1 - Results qualified by computer, minimal validation by ESAT (3 day turnaround)*

*** Plus 1 - 5 days for processing and mailing.**